2018 | ACCOMPLISHMENTS REPORT

Climate change is happening now. Eight of California's largest, deadliest, and most destructive wildfires occurred in the last two years.

No state is doing more to combat climate change than California. Yet for every step forward, the need for another appears. California's Fourth Climate Change Assessment, a landmark compilation of scientific research released this summer by the California Energy Commission and others, offered a comfortless forecast about how climate change threatens lives and energy infrastructure. Two-thirds of Southern California's beaches could be wiped out, and the average area burned by wildfires could nearly double by 2100.

To bring attention to the planet's plight, Governor Edmund G. Brown Jr. hosted the Global Climate Action Summit in September. More than 4,000 delegates from six continents participated in the three-day event to recharge meaningful actions to combat climate change. As part of the summit, the Governor signed Senate Bill 100, which requires 60 percent of electricity to be sourced from renewable energy by 2030 and sets a planning goal that 100 percent be sourced from zero-carbon sources by 2045. He issued an executive order that calls for carbon neutrality by 2045. The California Energy Commission will verify the progress made toward these goals. Governor Brown noted that these are ambitious goals but necessary to confront a changing climate.

Climate change is happening now. Eight of California's largest, deadliest, and most destructive wildfires occurred in the last two years. More acreage was burned in 2018 than in 2017. Governor Brown and the Legislature hammered out a number of responses to the challenges of fires and extreme weather. Cutting-edge scientific research provided by the Energy Commission served as the foundation for some of the decision making.

The need for a foundation of comprehensive California energy data, research on innovative solutions, strong policy implementation, and convincing assessments of policy analyses is what drives the researchers, scientists, engineers, attorneys, and other employees of the Energy Commission. This 2018 California Energy Commission Accomplishments Report provides some of the highlights.

During 2018, the Energy Commission approved building energy efficiency standards requiring solar panels on new homes. Increasing solar energy will reduce the use of fossil fuels and save consumers money. These standards were based on the New Solar Homes Partnership, which in the past 11 years has led to the installation of more than 42,000 photovoltaic systems and helped reduce the cost of solar to the point that direct government subsidies are no longer needed.

The Energy Commission's Proposition 39 program has provided more than $1.6 billion to schools to install energy efficiency upgrades and lower energy bills. Commission staff finished processing grants this year and will continue to monitor the progress of the program.

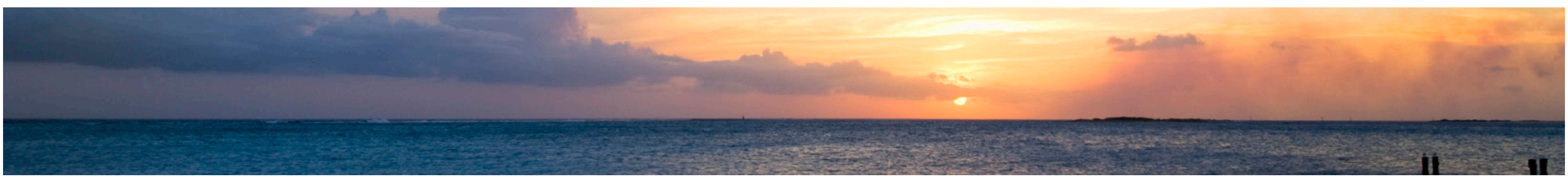
The Energy Commission with the California Public Utilities Commission (CPUC) hosted the first meeting of the Disadvantaged Communities Advisory Group, which was established by Senate Bill 350. The group is working to ensure low-income households benefit from 21st century grid advancements and cleantech.

The Energy Commission's Alternative and Renewable Fuel and Vehicle Technology Program celebrated its 10th anniversary. The program has invested more than $750 million to speed the development of transportation technologies. This year, Governor Brown signed an executive order calling for at least five million zero-emission vehicles on California roads by 2030, as well as a significant increase in the charging and refueling infrastructure to power these vehicles. The Energy Commission will work to ensure these chargers and stations are located throughout the state. Also, the Energy Commission began a program to replace the state's most polluting school buses. Demand is significantly higher than available funds.

The year has been productive because of the leadership of our commissioners, our dedicated staff, and engaged stakeholders. I appreciate the professionalism, collaboration, and willingness to share ideas in a transparent and inclusive forum. While the challenges of climate change remain, the people at the Energy Commission will continue to provide the data and science for principled climate policies for this generation and the next.

Sincerely,

Chair Robert B. Weisenmiller
California Energy Commission



Achieving Energy Efficiency

The California Energy Commission establishes appliance and building energy efficiency standards that improve the health, safety, and economic well-being of Californians. The goal is to update energy efficiency standards to reduce inefficient and wasteful electricity uses in appliances and in new and existing buildings.

- In 2018, the Energy Commission adopted a solar requirement for new homes, which will be part of the 2019 Building Energy Efficiency Standards. The standards are the first in the nation to require solar and go into effect in 2020. In new homes, the standards are projected to cut energy demand from the electric grid by more than 50 percent, save homeowners money, and eliminate 235,000 metric tons of greenhouse gas emissions annually.

- To ensure consumers get the energy savings they expect when buying an appliance, the Energy Commission enforces energy efficiency standards by testing products, engaging with manufacturers and retailers, and issuing penalties. In 2018, the Energy Commission settled 32 cases with manufacturers for violating appliance efficiency standards.

- The Energy Commission began reviewing building owners' energy benchmarking data submitted through the ENERGY STAR Portfolio Manager®, an online tool used to measure and track energy and water consumption, as well as greenhouse gas emissions. Allowing owners to compare their energy usage to similar buildings will help them consider energy efficiency improvements that reduce energy use and produce savings.

- During its final year of processing new grants, the Energy Commission's Proposition 39 K-12 program provided more than $1.5 billion in funds to 98 percent of public school districts to improve 7,300 school buildings and help lower energy bills. Upgrades include switching to light-emitting diode (LED) lighting, replacing inefficient air-conditioning and heating units, and installing solar panels.

- The Energy Commission invests in energy efficiency research. One grantee developed a free, home energy assessment app—accessed via a mobile phone—that helps consumers identify wasteful energy around the home. The Dr. Power app focuses on reducing the energy use of televisions, printers, set-top boxes, and other appliances.

- The Energy Commission adopted energy efficiency standards for portable electric spas that will save consumers $45 million annually. California is home to more than a million spas, and thousands of new ones are sold each year. The new standards will produce annual energy savings equivalent to the amount of electricity used in nearly 30,000 homes in a year.

- The Energy Commission awarded more than $13 million in energy efficiency and clean energy project loans through the Energy Conservation Assistance Account, benefiting nine eligible cities, counties, schools, and public hospitals. These projects will save recipients nearly $1 million in annual energy costs and reduce greenhouse gas emissions over the life of the projects.

Investing in Energy Innovation

The Energy Commission is improving the quality of life for Californians by supporting environmentally sound, safe, reliable, and affordable electricity services and products. Each year, it invests about $150 million for research in clean energy strategies and innovations.

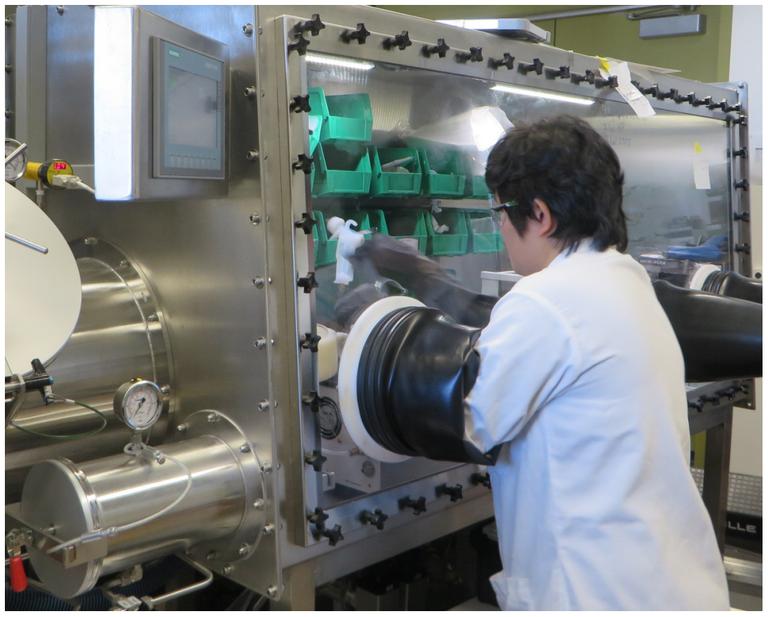
- The Energy Commission invested in clean energy entrepreneurs through the Energy Commission's Energy Innovation Ecosystem, a statewide network connecting entrepreneurs with the training, resources, and expertise needed to turn advanced technologies and concepts into products that can benefit consumers, companies, and utilities. Examples include Electric Program Investment Charge (EPIC) funded programs such as the Cyclotron Road Fellowship, where innovators collaborate with leading scientists from the Lawrence Berkeley National Laboratory, and the CalSEED program, which helps innovators turn early concept ideas into viable products.

- In 2018, the Energy Commission allocated about 41 percent of EPIC program funding for technology, demonstration, and deployment projects located in disadvantaged communities, while roughly 32 percent of technology, demonstration, and deployment projects have been awarded in disadvantaged communities since the beginning of the program.

- The Energy Commission invested $5 million in a community-scale energy efficiency demonstration project with the California Homebuilding Foundation in Fresno County. The objective of the project is to overcome cost barriers to designing and building near-zero-emission homes through installing and monitoring high-efficiency systems, appliances, and other measures. The project will measure the energy-saving results and determine economic feasibility, evaluate occupant interactions and impacts on savings, evaluate building and technology impacts on indoor air quality, and increase understanding of how enhancements in energy efficiency will impact real estate market values and decisions. This information will provide resources to homebuilders to support California's aggressive goal to make the energy system of homes near zero-emission.

- The Energy Commission funded a solar-storage microgrid at the Richmond Medical Center, a 50-bed, acute-care facility, that optimizes solar energy production and battery energy storage. The microgrid can not only help the hospital provide critical health services in the event of a grid outage but also deliver significant cost savings. Similar microgrids are providing reliable, resilient, and secure energy at the U.S. Naval Base in San Diego, the Port of Long Beach, and the Redwood Coast Airport in Humboldt County.

- The Energy Commission is investing in energy storage, one of the most promising clean energy technologies. Although battery technology is rapidly evolving, more research is needed to overcome obstacles to the wider acceptance of the technology. In 2018, the Energy Commission funded more than a dozen energy storage projects such as a 30 megawatt (MW) lithium-ion battery storage facility in San Diego, capable of storing up to 120 megawatt-hours of energy and serving up to 20,000 customers for four hours.



Advancing **Energy Policy**

The Energy Commission provides statewide planning and forecasting to accurately measure electricity demand and supply. The goal is to develop state energy policy that provides safe, reliable, and affordable clean energy for California.

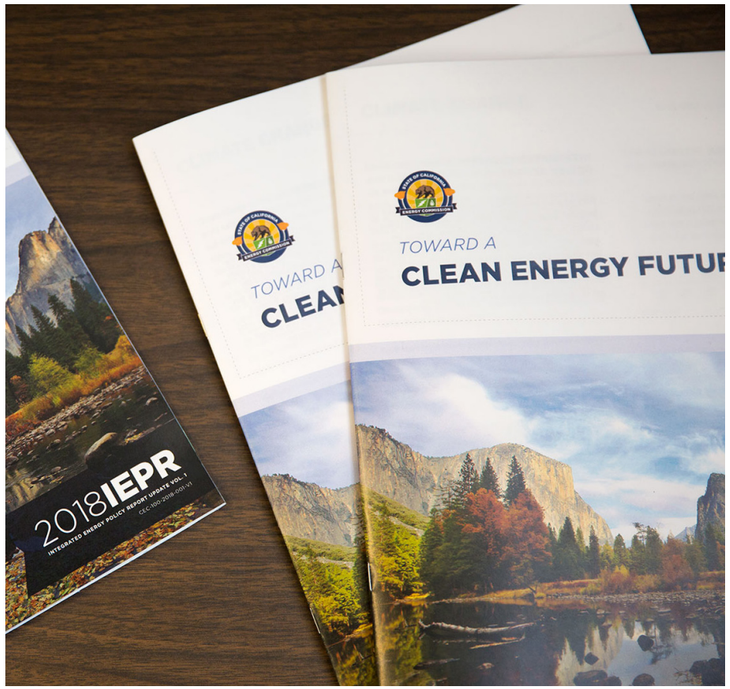
- The Energy Commission led the portion of California's Fourth Climate Change Assessment that focused on energy. The assessment presented more than 50 reports, many of which forecast a future characterized by devastating wildfires, rising seas, heat waves, and dramatic shifts in weather. Energy-related assessment reports found that rising sea levels threaten the environment, economy, and urban infrastructure. Yet the sobering findings of the assessment included an action plan for adaptation that includes vegetated dunes, marsh sills, and protected oyster reefs to hold back rising seas.

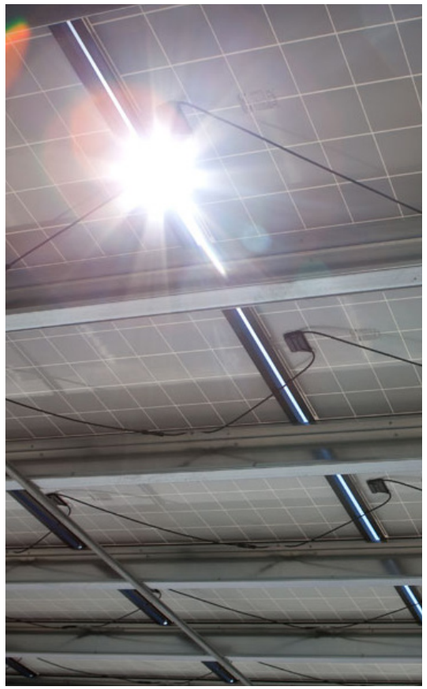
- Along with the CPUC, the Energy Commission convened the first Disadvantaged Communities Advisory Group to help ensure benefits of the 21st century grid reach low-income households and hard-to-reach customers such as those in tribal and rural communities. The group will advise the Energy Commission and the CPUC on ways to help disadvantaged communities benefit from proposed clean energy and pollution reduction programs.

- The Energy Commission's 2018 Integrated Energy Policy Report (IEPR) Update provided recommendations to address energy policy issues. For the first time, the IEPR included a Volume 1 and video to illustrate the innovative policies of California and the role they have played in establishing a clean energy economy. The 2018 IEPR Update Volume II, scheduled to be published in February 2019, focuses on implementing climate adaptation, integrating renewable energy, doubling energy efficiency, establishing energy equity, and decarbonizing buildings.

- The Energy Commission released the California Energy Demand 2018–2030 Revised Forecast report, which revises the 12-year forecasts for electricity consumption, retail sales, and peak demand for each of California's five major electricity planning areas. The report found expected consumption to remain at a moderate growth rate. It pointed to estimated energy savings expected from additional energy efficiencies and photovoltaic adoption.

- The Energy Commission relies on many sources of data to support California's energy efficiency, renewable energy, and greenhouse gas reduction policies to combat climate change. Title 20 Data Collection Regulations were adopted that provide new and expanded ways to collect and coordinate statistics and energy-related analyses. Predicting where load reductions will take place because of efficiency measures and behind-the-meter resources helps utilities and regulators reduce the need for new fossil-fueled generation.





Developing **Renewable Energy**

The Energy Commission plays a pivotal role in California's development and adoption of renewable energy. The Energy Commission administers the state's landmark Renewables Portfolio Standard (RPS), ensures the state's utilities disclose electricity sources to consumers, supports renewable energy development, and tracks the state's progress toward its renewable energy goals.

- The Energy Commission's New Solar Homes Partnership program has been providing incentives for solar photovoltaic systems on new homes for more than a decade. In the past 11 years, the program has awarded more than $190 million for the installation of more than 42,000 photovoltaic systems. The program has helped achieve large reductions in cost of installing solar photovoltaic systems with a price decline of more than 50 percent for California residential installations.

- For the first time, the Energy Commission reported solar generated electricity is the largest portion of the state's renewable energy. In its Tracking Progress report, the Energy Commission disclosed solar and wind generation accounted for more than 67 percent of all renewable electricity generation in 2017.

- The Energy Commission certifies renewable power plants as eligible for the RPS, verifies load-serving entities procurement of renewable electricity, and oversees the state's 42 publicly owned utilities' compliance with the RPS mandate. California is well on its way to meeting the 33 percent by 2020 and the 60 percent by 2030 RPS targets.

- The Energy Commission tracks the state's electricity production from geothermal plants. This past year, geothermal energy produced 13,000 gigawatt-hours (GWh) of electricity. Combined with another 700 GWh of imported geothermal power, geothermal energy produced nearly 6 percent of the state's electricity.

- To reduce risks associated with geothermal development, the Energy Commission awarded a contract to the California Department of Conservation's Division of Oil, Gas and Geothermal Resources to research known undeveloped geothermal wells and develop plans that local governments can use to properly close these wells. This contract is anticipated to be completed in 2019.

- The Energy Commission monitors hydroelectricity produced each year. Since the end of the recent five-year drought, hydroelectricity produced nearly 21 percent of in-state generation this past year.

- The Energy Commission and the U.S. Bureau of Ocean Energy Management (BOEM) are working together as part of a multigovernment task force considering potential offshore wind projects. BOEM regulates offshore energy uses in federal waters. In October, BOEM designated three potential offshore wind energy lease areas off California's north and central coasts.

- In 2018, Energy Commission staff developed the Renewable Energy for Agriculture Program (REAP) to provide grants for the installation of renewable energy technologies on agricultural operations. Funded as part of the California Climate Investments REAP will encourage participation from disadvantaged and low-income communities and fund projects that reduce greenhouse gas emissions and provide additional community benefits.

Transforming
Transportation

The Energy Commission's Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) invests in projects to speed the development of 21st century transportation and fuel technologies. The Energy Commission also collects data from the petroleum industry to assess current trends related to oil supply and customer demand to inform policy makers and the public. These investments and data collection help the state find ways to improve air quality, reduce petroleum use, and increase the adoption of zero-emission vehicles (ZEVs).

- The Energy Commission's ARFVTP celebrated its 10th anniversary during 2018. Working with stakeholders, such as government partners and private companies, the ARFVTP has invested more than $755 million over the past decade to advance a broad portfolio of innovations that are transforming the state's transportation landscape and provide all Californians with clean mobility options.

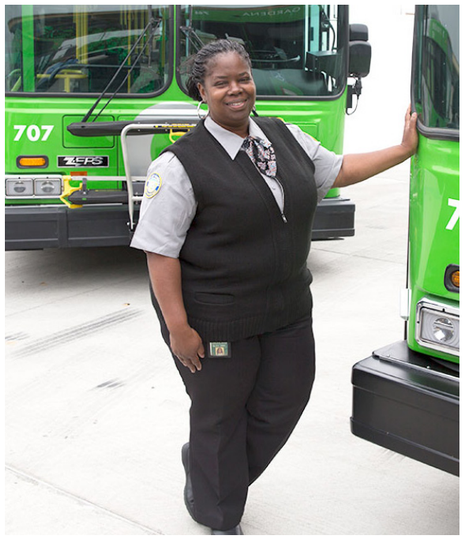
- The Energy Commission is investing in the development of 250,000 electric vehicle chargers and 200 hydrogen refueling stations across California by 2025–targets set by Governor Edmund G. Brown Jr. in a January 2018 executive order. Accelerating the expansion of infrastructure makes ZEVs a more viable option and will help California reach its goals of 1.5 million ZEVs on roads by 2025 and 5 million by 2030.

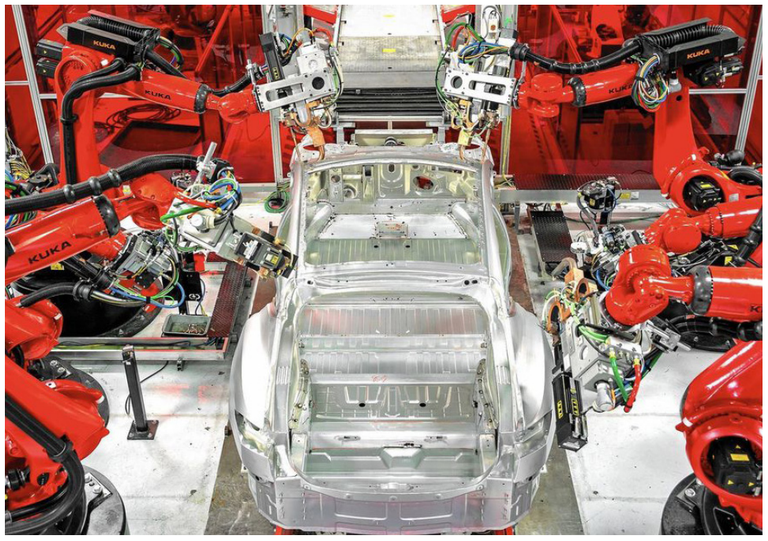
- The Energy Commission began the School Bus Replacement Program, which helps fund the transition from diesel buses to zero- or low-emission vehicles in low-income and disadvantaged communities. The program is distributing $75 million for buses. The program received requests from school districts for $500 million worth of school bus replacements. Transitioning to ZEVs improves the health of children and others by limiting exposure to transportation-related air pollution.

- The Energy Commission funded the California Electric Vehicle Infrastructure Project (CALeVIP), which launched a website during 2018. The CALeVIP works with community partners to develop and implement regional charging station infrastructure incentives.

- The Energy Commission partnered with the Ports of Los Angeles, Long Beach, and San Diego on five projects to demonstrate advanced, zero- and near-zero-emission freight technologies and alternative fuels in a variety of medium- and heavy-duty vehicle applications. Moreover, the Energy Commission regularly engages with seaports through the Ports Energy Collaborative, which provides a forum for the Energy Commission and the ports to discuss energy issues, mutual challenges, and opportunities for transitioning to alternative and renewable energy technologies.

- The 38th hydrogen refueling station funded by the Energy Commission became open to the public in 2018. The Energy Commission has awarded funds to 64 retail hydrogen refueling stations.

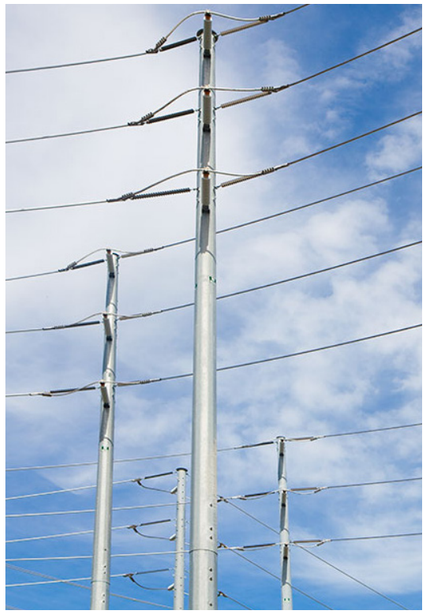




Evaluating
Power Plants

A key part of creating a safe and reliable electric system is ensuring that the review of proposed thermal power plants includes an assessment of the project's design, an analysis of its potential adverse environmental impacts, and a process for public input. The Energy Commission is responsible for conducting this review and ensuring that these permitted power plants comply with all laws and conditions of approval.

- The Energy Commission licensed a 98 MW natural gas-fired power plant with battery storage and oversaw the construction of three natural gas-fired power plants that have the capacity to produce more than 1,800 MW of electricity.
- The Energy Commission is working with the CPUC to evaluate the environmental impacts of transmission projects seeking approval for construction. The Energy Commission reviewed three projects during 2018. Adequate transmission lines help connect new electricity generation with California's grid.
- The Energy Commission continued its involvement in efforts to expand the western electricity markets and restructure regional reliability coordination organizations, which contribute to the strategies for achieving the state's renewable energy and GHG reduction goals.
- The Energy Commission continued its compliance monitoring of power plants to protect public health and safety, promote general welfare, and preserve environmental quality. During 2018, the Energy Commission opened 14 investigations, closed 9, and entered into 2 settlement agreements.
- The Energy Commission established a new process to ensure that construction and modifications of power plants are completed safely and in compliance with the California Building Code. To date, the Energy Commission has approved 18 power plant modifications.
- The Energy Commission is working in collaboration with the California Independent System Operator, the CPUC, and a team of western utilities to complete a study on the opportunities for expanding the transmission ratings of the Pacific Intertie to increase imports of zero-emission electricity to replace gas-fired generation in Southern California that is served by Aliso Canyon.
- The Energy Commission processed a closure plan for a coal-fired power plant, continuing the turnover of fossil fuel resources to renewable energy resources.



Maintaining **Strong Partnerships**

- The Energy Commission has hosted more than 2,500 international delegations since the foreign visitor program began in 1986. In 2018, the Energy Commission hosted 72 foreign visitor groups from six continents to share best practices on energy efficiency and conservation, increase investments in clean tech, expand collaboration on electric grid technology, promote renewable energy, and improve global climate change initiatives.

The Energy Commission works to leverage its experiences and policies to maximize benefits at home and beyond the state line. California's goal is to increase collaboration, internationally and within the state, on environmental protection and economic development in the drive to a clean energy future.

- The Energy Commission partnered with Mexico to promote cooperation on clean energy policy. Efforts are underway to create joint California-Mexico research centers focusing on energy efficiency measures such as efficient lighting.

- The Energy Commission and the Government of Denmark signed a memorandum of understanding to share knowledge and best practices for the development of offshore wind generation. This agreement recognizes the common interest in developing offshore wind energy as a clean and sustainable energy source and help California meet its goal to obtain 100 percent of the state's electricity from carbon-free resources by 2045.

- The Energy Commission partnered with China, establishing the California-China Clean Technology Partnership to address issues related to climate change and achieve low-carbon development goals. The partnership was formed to accelerate clean technologies, establish partnerships for companies, drive clean tech innovation, and develop green and low-carbon industries while supporting existing economies.

- The Energy Commission and the German Federal Ministry for Economic Affairs and Energy partnered with the California Air Resources Board and the CPUC for the 2018 California-Germany Bilateral Conference. The conference brought industry experts, think tanks, and policy makers from Germany and California together to discuss recent developments and deepen the understanding of long-term trends in energy use.

- The Energy Commission is collaborating with the California Department of General Services to advance renewable energy. These efforts include storing electricity generated from renewables, using more efficient fuel cells and hydrogen technology in cars, and establishing vigorous benchmarks involving zero net energy in state buildings, electric vehicle service equipment, and charging stations.

Energy Commission **Headquarters**

This Accomplishments Report focuses on the action taken in the past year by the Energy Commission that benefit Californians. Yet there is another story to share that provides an example of moving toward a clean-energy future that directly benefits those who work in the Energy Commission's headquarters.

In 2018, the Warren-Alquist State Energy Building, located at 1516 Ninth Street in Sacramento, was recognized as LEED gold certified and earned ENERGY STAR certification from the U.S. Environmental Protection Agency. LEED is the acronym for Leadership in Energy and Environmental Design and is a rating system devised by the United States Green Building Council that is used to evaluate the environmental performance of a building and to encourage sustainable design.

The LEED and ENERGY STAR certification initiatives of the Energy Commission's building is based on a Governor Edmund G. Brown Jr. executive order that directed state agencies to take steps to reduce greenhouse gas emissions and obtain LEED silver certification for state buildings.

The Energy Commission's building did well in the ranking, but three factors set it apart. Because of upgraded water fixtures and fittings, water savings was increased 41 percent, or approximately 650,000 gallons annually, compared to the LEED baseline. That is a water savings of about the volume of an Olympic-size swimming pool saved every year. In partnership with the Sacramento Municipal Utility District, the building offsets 100 percent of the electricity use with renewable energy sources. And a survey revealed why the building's lobby is brimming with bicycles. About 58 percent of Energy Commission employees commute using alternative forms of transportation, such as busses, light rail, biking, walking, carpooling, or driving a hybrid, electric or fuel-efficient vehicle.

On average, ENERGY STAR certified buildings use 35 percent less energy, cause 35 percent fewer greenhouse gas emissions, and are less expensive to operate than their peers—all without sacrifices in performance or comfort.

While there is more to be done, the success of the Energy Commission's building can be an example of what is possible.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